

FIFTH SEMESTER DIPLOMA EXAMINATION IN ENGINEERING/
TECHNOLOGY—MARCH, 2014

GEOTECHNICAL ENGINEERING

(Common to CE, EV, WR and QS)

[Time : 3 hours

(Maximum marks : 100)

Marks

PART—A

(Maximum Marks : 10)

I Answer all questions in one or two sentences. Each question carries 2 marks.

1. Define the terms void ratio and porosity.
2. State Darcys law.
3. What is significant depth in depth of exploration ?
4. What is skin friction.
5. Define foundation.

(5x2=10)

PART—B

(Maximum Marks : 30)

II Answer *any five* questions from the following. Each question carries 6 marks.

1. Establish the relationship between e , G , W and S .
(Void ratio, Specific gravity, Water content and Degree of saturation)
2. Write any six uses of particle size distribution curve.
3. Explain any six factors that affect permeability of soil.
4. Give procedure to determine the optimum moisture content and corresponding maximum dry density by standard procter test.
5. List and explain different methods of boring for soil exploration.
6. What is a combined footing ? Sketch the plan of a rectangular combined footing and explain the circumstances under which it is essential.
7. Explain briefly the factors to be considered while fixing the depth of foundation.

(5x6=30)

PART—C

(Maximum Marks : 60)

(Answer *one* full question from each unit. Each full question carries 15 marks.)

UNIT – I

- III (a) Define plastic limit. Give the procedure to determine the plastic limit of a given sample of soil. 8
- (b) The in-situ density of an embankment, compacted at a water content of 12% was determined with the help of a core cutter. The empty mass of the cutter was 1286g and the cutter full of soil had a mass of 3195g. Volume of the cutter being 1000cm^3 , determine bulk density, dry density and degree of saturation of the embankment. Take $G = 2.70$. 7

OR

- IV (a) Explain the corrections applied for hydrometer reading and composit correction. 8
- (b) Differentiate between bulk density and dry density of soil. Explain the procedure for finding the field density of soil using core cutter. 7

UNIT – II

- V (a) Explain with fig. constant head permeability test to determine co-efficient of permeability. 8
- (b) Explain the factors which affect compaction of soil. 7

OR

- VI (a) Calculate the co-efficient of permeability of a soil sample 6cm in height and 50cm^2 in cross-sectional area, if a quantity of water 430cc passed down in 10 minutes under an effective constant head of 40cm.
On over drying the test specimen weighed 4.98N. Calculate the seepage velocity and discharge velocity of water during the test. Take $G = 2.65$. 8
- (b) What are the methods used in the field for compacting the soil. Explain with suitability. 7

UNIT – III

- VII (a) What are the objectives of soil investigation? 5
- (b) What are the guide lines for selecting the depth of exploration. 5
- (c) Explain general and local shear failure. 5

OR

- VIII (a) What is reconnaissance? What type of information is obtained in reconnaissance? 5
- (b) Explain disturbed and undisturbed soil sample. Distinguish between their uses. 5
- (c) What are the limitations of plate load test. 5

UNIT – IV

- IX (a) Explain any two methods for the rectification of tilts and shifts of a well foundation. 5
- (b) Explain classification of piles based on mode of transfer of loads. 5
- (c) Determine the size of a square shallow footing for a column carrying a dead load of 105kN and line load of 75kN. Safe bearing capacity of soil is 80kN/m². 5

OR

- X (a) What are the objective of providing foundation for structure. 5
- (b) State any five conditions which necessitate pile foundation for a structure. 5
- (c) Explain with neat figure the well curb and cutting edge of a well foundation. 5
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